



## LMS 220/221

Our non-contact Laser Measurement System (LMS) can be used for standard applications involving measurement of objects and position determination, monitoring areas, vehicle guidance and collision control. The fundamental ability of LMS is to offer accurate distance measurement throughout the 180° scanning field. Within this field, the LMS can be programmed to monitor multiple zones. These zones can then be assigned to solid state outputs of the LMS. Beyond this simple mode of operation the LMS will transmit all 180 measurements via a high speed RS 422 serial port. The Host system can then use this data for specific applications.

LMS measurements are based on time-of-flight measurement. The LMS calculates the distance to the

object using the time-of-flight of pulsed light; i.e. the length of time between sending and receiving the beam of light.

An extremely short pulse of light (infrared laser beam) is transmitted towards an object. Part of the light is reflected back to the unit a fraction of a second later. A rotating mirror deflects the pulsed light beam to many points in a semi-circle. The precise direction is given by an angular sensor on the mirror (laser RADAR). A large number of coordinates measured in this way are put together to form a model of the surrounding area's contours. Using the serial interface of the unit, measurements are transferred in real time to a host PC/PLC for further evaluation.

### Features

- 180° coverage
- Outdoor applications
- High measurement resolution 0.39 in (10 mm)
- Integrated heating
- Contact-free measurement
- Fog correction (LMS 221)
- Target objects require no reflectors or markings
- Transfer of measurement data in real time
- Active system, no illumination of target objects necessary
- Measurements possible over long distances up to 26.2 ft (80 m)
- Three internally programmable monitoring fields assigned to three switching outputs

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## Technical Data

	LMS 220	LMS 221
<b>General</b>		
Range	Maximum 26.2 ft (80 m)	
Angular Resolution	0.25°/0.5°/1.0° (selectable)	
Response Time	53/26/13 ms	
Measurement Resolution	0.39 in (10 mm)	
System Error (environmental conditions: good visibility, T <sub>a</sub> = 73°F (23°C) reflectivity 10%...10,000%)	Typ ± 15 mm (mm-mode), range 3.2...26.2 ft (1...8 m) Typ ± 4 cm (cm-mode), range 3.2...65.6 ft (1...20 m)	Typ ± 35 mm (mm-mode), range 3.2...65.6 ft (1...20 m) Typ ± 5 cm (cm-mode), range 3.2...65.6 ft (1...20 m)
Statistical Error, Standard Deviation (1 sigma)	Typ ± 5 mm (at range ≤ 8 m/ ≥ 10% reflectivity/ ≤ 5 klux)	Typ ± 10 mm (at range 1...20 m/ ≥ 10% reflectivity/ ≤ 5 klux)
<b>Electrical</b>		
Data Interface	RS 232/RS 422 (configurable)	
Transfer Rate	9.6/19.2/38.4/500 kBd	
Switching Outputs, Standard Variants	3 x PNP; typ. 24 V DC; OUT A, OUT B maximum 250 mA, OUT C maximum 100 mA	
Switching Outputs, Relay Variants (available in LMS 221 only)	OUT A, OUT B (relay) maximum switching voltage 48 V DC/26 V AC (protected low voltage, safe isolation from mains) maximum switching current 0.7 A; maximum switching power 30 W OUT C/weak (PNP) typical 24 V DC, maximum 100 mA	
Supply Voltage (Scanner-electronics)	24 V DC ± 15% (maximum 500 mV ripple), current requirements maximum 1.8 A (including output load)	
Supply Voltage (Heating)	24 V DC (maximum 6 V ripple), current requirement maximum 6 A (cyclic)	
Power Uptake	Approx. 20 W (without output load)	
Electrical Protection Class	Safety insulated, protection class 2	
Interface Resistance	According to IEC 801, part 2-4; EN 50081-1/50082-2	
Ambient Temperature (Operating/Storage)	-22...122°F (-30...50°C) (warming up time approx. 120 min at T <sub>min</sub> )/-22...158°F (-30...70°C)	
<b>Mechanical</b>		
Enclosure Rating	IP 67	
Weight	Approx. 19.8 lb (9 kg)	
Dimensions	7.3 x 6.1 x 8.3 in (185 x 156 x 210 mm); with cables: 7.3 x 6.1 x 10.4 in (185 x 156 x 265 mm)	
Vibration Fatigue Limit	According to IEC 68 part 206, table 2C, frequency range 10...150 Hz, amplitude 0.35 mm or 5 g single impact IEC 68 part 2-27, table 2, 15 g/11 ms permanent vibration IEC 68 part 2-29, 10 g/16 ms. Shock absorbers are recommended for heavy vibration and impact demands (e.g. AGV applications).	